Electronic Version
Stylesheet Version v1.1.1

Claims

[c1] A magnetic resonance imaging assembly comprising:
a magnet assembly defining a scanning bore along a z-direction;
a surface coil assembly positioned within said scanning bore, said surface coil assembly receiving an imaging field, said surface coil assembly comprising:
a first surface coil positioned along said z-direction, said first surface coil induced with a first coil current comprised of a first coil amplitude and a first coil phase; and
a second surface coil positioned along said z-direction, said second surface coil induced with a second coil current comprised of a second coil amplitude and a second coil phase, said second coil phase varied from said first coil phase to correct asymmetries with said imaging field.

[c2] A magnetic resonance imaging assembly as described in claim 1, wherein said first surface coil comprises:
a rectangular loop coil having an extended length dimension, said extended length dimension aligned along said z-direction.

[c3] A magnetic resonance imaging assembly as described in

claim 1, wherein said first surface coil and said second surface coil comprise conductive rods.

[c4] A magnetic resonance imaging assembly as described in claim 1, further comprising:
a ground plane element, said first surface coil and said second surface coil in electrical communication with said ground plane element.

[c5] A magnetic resonance imaging assembly as described in claim 1, further comprising:
a phase shifting network in communication with said first surface coil and said second surface coil, said phase shifting network varying said second coil phase from said first coil phase.

[c6] A magnetic resonance imaging assembly as described in claim 5, wherein said phase shifting network further varies said second coil amplitude from said first coil amplitude.

[c7] A magnetic resonance imaging assembly as described in claim 1, wherein said second coil amplitude is varied from said first coil amplitude such to correct elliptical polarization of said imaging field.

[c8] A magnetic resonance imaging assembly as described in claim 1, wherein said surface coil assembly further com-

prises:

a third surface coil positioned along said z-direction, said third surface coil supplied with a third coil current comprised of a third coil amplitude and a third coil phase.

[c9] A magnetic resonance imaging assembly as described in claim 1, wherein said surface coil assembly further comprises:

a decoupling circuit positioned in communication with both said first surface coil and said second surface coil.

[c10] A magnetic resonance imaging assembly as described in claim 1, further comprising:

a controller in communication with said first surface coil and said second surface coil; and

a pre-amplifier positioned in communication with said first surface coil and said second surface coil.

[c11] A magnetic resonance imaging assembly as described in claim 1, wherein said second coil phase is varied by varying the current path length of said second coil current.

[c12] A magnetic resonance imaging assembly comprising:

a magnet assembly defining a scanning bore;

a surface coil assembly positioned within said scanning

bore, said surface coil assembly receiving an imaging field, said surface coil assembly comprising:
a first surface coil, said first surface coil induced with a first coil current comprised of a first coil amplitude and a first coil phase; and
a second surface coil, said second surface coil induced with a second coil current comprised of a second coil amplitude and a second coil phase;
a controller in communication with said surface coil assembly, said controller including logic adapted to vary said second coil phase and said first coil phase independently to correct said imaging field.

[c13] A magnetic resonance imaging assembly as described in claim 12, further comprising:
a ground plane element, said first surface coil and said second surface coil in electrical communication with said ground plane element.

[c14] A magnetic resonance imaging assembly as described in claim 12, further comprising:
a phase shifting network in communication with said first surface coil and said second surface coil, said phase shifting network varying said second coil phase from said first coil phase.

[c15] A magnetic resonance imaging assembly as described in

claim 12, wherein said logic is adapted to vary said second coil amplitude and said first coil amplitude independently to correct said imaging field.

[c16] A magnetic resonance imaging assembly as described in claim 12, wherein said surface coil assembly further comprises:
a decoupling circuit positioned in communication with both said first surface coil and said second surface coil.

[c17] A method of producing a magnetic resonance image comprising:
placing a subject within a subject gap of a magnetic assembly;
placing a surface coil assembly within said subject gap, said surface coil assembly comprising a first surface coil and a second surface coil;
receiving an imaging field using said surface coil assembly;
controlling a first coil current induced in said first surface coil, said first coil current comprised of a first coil amplitude and a first coil phase;
controlling a second coil current induced in said second surface coil, said second current comprised of a second coil amplitude and a second coil phase;
adjusting said second coil current and said first coil current to reduce phase-shift in said imaging field.

[c18] A method as described in claim 17, further comprising:
supplying a first coil current to in said first surface coil, said first coil current comprised of a first coil amplitude and a first coil phase;
supplying a second coil current to said second surface coil, said second current comprised of a second coil amplitude and a second coil phase.

[c19] A method as described in claim 18, further comprising:
adjusting said second coil amplitude and said first coil amplitude independently to reduce phase-shift in said imaging field.

[c20] A method as described in claim 17, further comprising:
using a controller with embedded logic to automatically make adjustments to said first coil current and said second coil current to reduce phase-shift in said imaging field.